

REMARKS

Claims 1-5 are pending in the application. Claims 3 and 5 are amended herein. The cancelled matter from claims 3 and 5 is now presented in claims 7 and 6 respectively. No new matter is added by the claims. Upon entry of the amendment, claims 1-7 will be pending.

Claim rejection -35 U.S.C. §112, second paragraph

Claims 3 and 5 have been rejected under 35 U.S.C. §112, second paragraph for allegedly failing to distinctly claim the subject matter which the Applicant regards as his invention. Specifically, the Examiner rejected the claims for containing two sentences. The second sentence of each claim 3 and claim 5 is now recited in a new claim, specifically claim 7 and claim 6. As the amendment was made for the purpose of clarity, no equivalents are surrendered by the amendment. Withdrawal of the rejection is respectfully requested.

Claim rejection -35 U.S.C. §102(b) for anticipation

Claims 1-5 are rejected under 35 U.S.C. §102(b) for allegedly being anticipated by the Japanese patents JP 2003-238544 (hereinafter the '544 patent) and JP 2003-231680 (hereinafter the '680 patent).

Applicant respectfully disagrees.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

The Office Action states that both the '544 patent and the '680 patent disclose methods of manufacture of an epoxide from olefins using hydrogen peroxide in the presence of a catalytic composition. In the '554 patent the catalyst is alleged to be comprised of a tungsten oxide solution, trisodium monophosphate, and trioctylmethylammonium hydrogen sulfate in toluene. In the '680 patent, the catalyst is alleged to be comprised of a tungsten oxide solution, a sodium-borate solution, and a trioctylmethylammonium hydrogensulfate, and toluene. The Office Action alleges that the combination of a quaternary ammonium salt and hydrogen sulfate salt in solution, as claimed in claim 1, is essentially the same as trioctylmethylammonium hydrogensulfate salt in solution in the cited '554 and '680 patents.

Applicant respectfully disagrees and submits that the trioctylmethylammonium hydrogensulfate salt as in claim 1 is not obtained by mixing only the trioctylmethylammonium chloride and the sodium hydrogen sulfate as suggested in the Office Action. This is demonstrated by two publications provided herewith that teach that the reaction products of a quaternary amine and sulfuric acid. Relevant portions of the references are reproduced below.

K. Sato et al. (Kazuhiko Sato et al., Oxidation of sulfides to sulfoxides with 30% hydrogen peroxide under organic solvent- and halogen-free conditions, *Tetrahedron*, 57(2001), 2469-2476) states:

The mixture of $[\text{CH}_3(\text{n-C}_8\text{H}_{17})_3\text{N}]\text{Cl}$ and 49% of H_2SO_4 in toluene was stirred vigorously for 12h., the aqueous phase was removed, further added 49% of H_2SO_4 to the organic phase and vigorously stirred for 12 h. Removal of volatile material gave methyltrioctylammonium hydrogensulfate. (p. 2473, right col. 4.3)

K. Sato and M. Aoki et al. (K. Sato et al., Practical method for expoxidation of terminal olefins with 30% hydrogen peroxide under halide free conditions, *J. Org. Chem.*, 1996, 61, 8310-8311) states:

The dimethyl sulfate was added to (n-C₈H₁₇)₃N toluene solution, then the mixture was heated at 140°C for 17 h. followed by added water and heated at 90°C for 12h. The mixture was cooled, then added 49% of H₂SO₄ and vigorously stirred for 12h. Removal of volatile material gave methyltri-n-octylammonium hydrogensulfate. (p. 8311, left col.).

As evidenced above, the preparation of the trioctylmethylammonium hydrogensulfate salt is not trivial, even in solution. Consequentially, the combination of trioctylmethylammonium chloride and the sodium hydrogen sulfate of the instant invention is chemically distinct from the trioctylmethylammonium hydrogensulfate salt described in the cited '544 and '680 patents.

As described in K. Sato et al. and K. Sato et al., the trioctylmethylammonium hydrogensulfate salt is not easily prepared, e.g. the preparation thereof requires at least a longer reaction time. On the contrary, both trioctylmethylammonium chloride and the sodium hydrogen sulfate used in the instant invention are easily prepared, which is one of the advantages of the instantly claimed invention.

The cited '544 and '680 patents describe the use of the trioctylmethylammonium hydrogensulfate salt as the phase transfer catalyst which is not easily prepared. However, the instant invention uses the mixture of the quaternary ammonium salt, the phosphoric acids and/or the boric acids and the hydrogen sulfate salt. The instant invention is chemically distinct from those described in the cited references.

The quaternary ammonium salt, the phosphoric acids and/or the boric acids and the hydrogen sulfate salt are essential to the instant invention as described in Examples and Comparative Examples of the instant specification.

As is clear from Table 1:

The observed conversion rate was only 1.10% in Comparative Example 2, wherein only trio etylmethyarnmonium chloride was used alone.

The observed conversion rate was 4.30% in Comparative Example 4, wherein only trioctylmethylammonium chloride and sulfuric acid were used.

The observed conversion rate was 5.40% in Comparative Example 5, wherein only trioctylmethylammonium chloride and the sodium hydrogen sulfate were used.

However the observed conversion rate of 30.40% was demonstrated in Example 5 in which all three of the claimed components were used.

Further, the conversion rate was increased up to 73.10% under 6 hours of reaction time (Example 4).

The cited '544 and '680 patents disclose the use of the trioctylmethylammonium hydrogensulfate salt which is clearly distinct from the instantly claimed invention that includes the use of a mixture of a quaternary ammonium salt, phosphoric acid and/or boric acid, and a hydrogen sulfate salt of the instant invention.

The trioctylmethylammonium hydrogensulfate salt cannot be obtained by simply mixing the quaternary ammonium salt and the hydrogen sulfate salt. The use of the trioctylmethylammonium hydrogensulfate salt described in the cited '544 and '680 patents is clearly distinct from the instantly claimed instant invention, i.e. the use of a mixture of a quaternary ammonium salt and a hydrogen sulfate salt. Further the use of the trioctylmethylammonium hydrogensulfate neither anticipates nor makes obvious the use of the quaternary ammonium salt and the hydrogen sulfate salt.

CONCLUSION

In view of the above amendments and remarks, Applicants believe the pending application is in condition for immediate allowance.

FEE AUTHORIZATION

No fees are believed to be due. The Commissioner is authorized to charge any fees associated with this submission to our Deposit Account, No. 04-1105, Reference 65370(71526). Any overpayment should be credited to said Deposit Account. In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: February 19, 2009

Respectfully submitted,
Electronic signature: /Colleen McKiernan,
Ph.D./
Colleen McKiernan, Ph.D.
Registration No.: 48,570
Christine C. O'Day
Registration No.: 38,256
EDWARDS ANGELL PALMER & DODGE
LLP
P.O. Box 55874
Boston, Massachusetts 02205
(617) 517-5555
Attorneys/Agents For Applicant